Data as a Material for Design: Alternative Narratives, Divergent Pathways, and Future Directions

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Data is an invaluable resource, especially in technology-based settings. Sources and types of data can widely vary based on contexts. This paper focuses on human data as a material for design. More specifically, we are interested in exploring the utility of voice-based data of and for the marginalised community worldwide, collected from multifarious engagements run by different humanitarian and non government organisations (NGOs).

Additional Key Words and Phrases: voice-based data, marginalised community, human-computer interaction

ACM Reference Format:
Md Adnanul Islam. 2018. Data as a Material for Design: Alternative Narratives, Divergent Pathways, and Future Directions. In *Woodstock '18: ACM Symposium on Neural Gaze Detection, June 03–05, 2018, Woodstock, NY*. ACM, New York, NY, USA, 4 pages. https://doi.org/XXXXXXX.XXXXXXX

1 INTRODUCTION

Voice data can be a powerful material for design, offering new opportunities for creating immersive and engaging experiences. Voice-based interfaces have become increasingly popular in recent years, and designers are leveraging the power of voice data to create conversational experiences that are more human-like and personalized [2]. With voice data, designers can create conversational flows that are tailored to individual users, delivering personalized content and experiences. This data can also be used to improve the accuracy and responsiveness of voice-based interfaces, ensuring that users have a seamless and enjoyable experience [1]. As voice-based interfaces become more prevalent, designers will continue to explore the potential of voice data as a material for design, creating more immersive and engaging experiences for users [3].

2 VOICE DATA FOR REMOTE COMMUNITY ENGAGEMENTS

The use of digital infrastructures to support community engagements through traditional telephony systems is an innovative way to bridge the digital divide and increase participation in online platforms, especially for communities with limited access to smart devices or 3G coverage. Interactive Voice Response (IVR) interfaces allow users to access online platforms through button presses or speech recognition over phone calls, making it easier for them to engage with digital content and participate in online discussions. More and more NGOs are turning to remote community engagements due to factors such as practicality, cost, environmental concerns, and compliance with public health regulations. While some regions can use internet-based technologies such as Zoom for these engagements, many communities still depend on traditional telephone systems due to various socio-technical barriers, including limited access to smart devices or 3G coverage, cultural barriers, and low digital literacy. To address this digital divide, projects such as CGNet Swara, Gram Vaani, Awaaz, and Citizen Radio have combined traditional telephony with digital infrastructures, often using

Manuscript submitted to ACM

IVR interfaces to facilitate community engagements through button presses or speech recognition over phone calls [5]. These platforms have enabled communities to share their stories, access information, and participate in discussions.

These voice-based platforms also present an opportunity for community recordkeeping, which involves a participatory process with community stakeholders in documenting and preserving records within a collection. Community recordkeeping can empower communities by ensuring that records accurately reflect their experiences, providing evidence for their agendas, and holding organizations and institutions accountable. However, this approach has not yet been applied to voice-based platforms. By implementing community recordkeeping strategies, these platforms can enhance their impact and empower communities even further. We are currently exploring (running workshops) on recordkeeping approaches of marginalised community data (specifically voice data); the following discussions are in light of the preliminary insights from these workshops.

2.1 What data to collect?

Usually, NGOs collect voice recording, video recording, transcribed audio, photos, attendance sheets, personal details, notes and observations, and supporting identity documents (e.g., birth certificate) for different community engagements such as training programs, life skill developments, meetings, rallies (Figure 1). Although these are different types of data collected from and for underrepresented community, they may have some identical implications regarding the process of data handling, methods of data collection, and stumbling blocks of working with these data, which we discuss next considering voice data only.

2.2 How do design artefacts or systems (mis)interpret or transform the data

Design artifacts, objects, or systems can (mis)interpret, alter, or transform data in various ways, such as through bias, aggregation (leading to loss of important details or nuances in the data), transformation (altering the meaning and significance of the data), error (e.g., processing or propagating errors), and feedback loops (e.g., a recommendation system suggesting popular items may lead to those items becoming even more popular). It is essential to understand these dynamics and create responsible and ethical systems that use data more carefully.

2.3 The methods and experiences of data collection and expression

In the context of voice data, data collection and expression encompass various techniques, including speech recognition, natural language processing, voice assistants, voice biometrics, and voice analytics. These methods are widely used to capture and analyze spoken language to provide valuable insights into human behavior, language, and communication. For instance, speech recognition relies on algorithms that analyze acoustic properties of speech to transcribe spoken words and phrases into text. In contrast, voice analytics may involve using machine learning algorithms to extract insights related to customer behavior, sentiment, and other key performance indicators. As these technologies continue to advance, they will likely play an increasingly important role in a wide range of industries and applications. However, collection and preservation of voice data from underrepresented communities (including people unable to read and write) can be quite tricky, being a plausibly sensitive but often neglected task [4].

2.4 The stumbling blocks of working with data

For millions of people worldwide, voice data can be the one of the most effective modes (or only mode) of communication and education, considering their low literacy and/or poor internet connectivity, and specifically significantly low digital and data literacy. Often, this significantly large group of people is too busy with other (to them, bigger) life struggles to

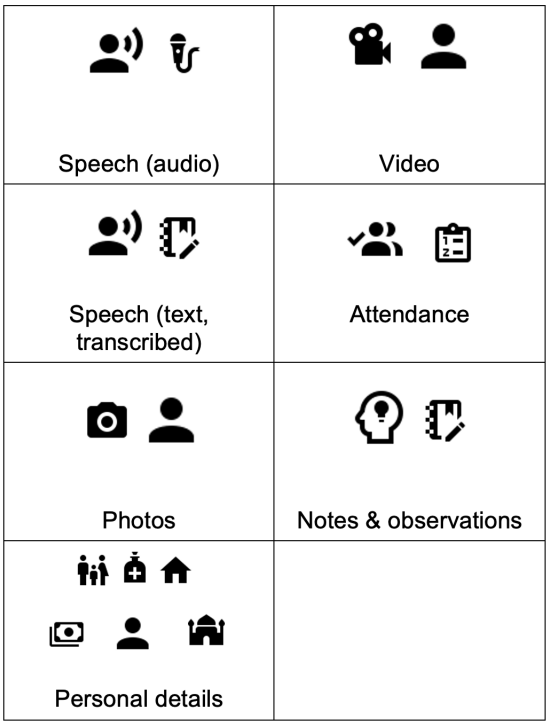

Fig. 1. Common data types collected from community engagements. The icons are used to communicate the data types with the people who cannot read.

be cautious about data security or privacy concerns (and to plausibly consider the significance of this issue). However, similar to other data types, there are several stumbling blocks of working with voice data or instances where practitioners can go wrong.

Firstly, voice data is often unstructured and can be very noisy, making it difficult to extract meaningful insights. Secondly, variations in speech patterns and accents can lead to errors in speech recognition. Thirdly, voice data requires significant computational resources and specialized hardware for processing, which can be expensive. Lastly, there are significant privacy concerns associated with voice data, which must be carefully managed to protect the rights of individuals.

3 CONCLUSION

The use of digital voice data for community engagement through traditional telephony systems (e.g., IVR) is a promising approach to bridging the digital divide and promoting inclusivity. By utilizing IVR-based voice data, individuals who do not have access to internet-based platforms can still participate in community engagement activities and access important information and resources. It is essential to make sustained investments in such projects to prevent digital exclusion from hindering individuals' access to the advantages of the digital era. By leveraging the power of technology and carefully designing appropriate technology, we can promote greater equity and create a more inclusive society.

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Received 20 February 2007; revised 12 March 2009; accepted 5 June 2009